National Institute of Environmental Health Sciences

Regional impact of climate on Japanese encephalitis in areas located near the Three Gorges Dam

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Abstract:

Background: In this study, we aim to identify key climatic factors that are associated with the transmission of Japanese encephalitis virus in areas located near the Three Gorges Dam, between 1997 and 2008. Methods: We identified three geographical regions of Chongqing, based on their distance from the Three Gorges Dam. Collectively, the three regions consisted of 12 districts from which study information was collected. Zero-Inflated Poisson Regression models were run to identify key climatic factors of the transmission of Japanese encephalitis virus for both the whole study area and for each individual region; linear regression models were conducted to examine the fluctuation of climatic variables over time during the construction of the Three Gorges Dam. Results: Between 1997 and 2008, the incidence of Japanese encephalitis decreased throughout the entire city of Chongqing, with noticeable variations taking place in 2000, 2001 and 2006. The eastern region, which is closest to the Three Gorges Dam, suffered the highest incidence of Japanese encephalitis, while the western region experienced the lowest incidence. Linear regression models revealed that there were seasonal fluctuations of climatic variables during this period. Zero-Inflated Poisson Regression models indicated a significant positive association between temperature (with a lag of 1 and 3 months) and Japanese encephalitis incidence, and a significant negative association between rainfall (with a lag of 0 and 4 months) and Japanese encephalitis incidence. Conclusion: The spatial and temporal trends of Japanese encephalitis incidence that occurred in the City of Chongqing were associated with temperature and rainfall. Seasonal fluctuations of climatic variables during this period were also observed. Additional studies that focus on long-term data collection are needed to validate the findings of this study and to further explore the effects of the Three Gorges Dam on Japanese encephalitis and other related diseases.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Meteorological Factors, Precipitation, Solar Radiation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Freshwater, None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Viral Encephalitis

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified